REMARKS

Claims 1-13 and 15-20 are active in the present application. The specification has been amended to correct a repeating typographical error. The word "traverse" has been replaced with "backward and forward". Support for the amendment is found in Figure 3 where the yarn guide (34) is shown to move in a backward and forward motion as indicated by M and the double headed arrow indicating the direction of motion. Further support is found in the specification on page 15, line 27 through page 16, line 8, wherein the travel of the yarn guide (34) is described in relation to the bobbin as shown in Figure 5. The claims have been amended to remove multiple dependencies and for clarity. Claim 20 is a new claim. Support for the new claim is found in original Claim 14. No new matter is believed to have been added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

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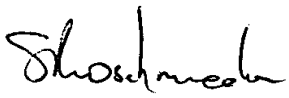

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IN THE SPECIFICATION

Page 1, prenumbered lines 13-29, please replace the paragraph with the following paragraph:

In the case of glass yarns, glass filaments obtained by molten glass flowing through orifices in a bushing are drawn. Next, these filaments are coated with a sizing composition by a coater so as to facilitate the fiberizing and the collecting of the filaments into a yarn and to increase their mechanical properties, especially upon ageing. These filaments are then brought together into a combining device in order to create the yarn to be wound. The yarn coming from the combining device is wound around a support which lies in a horizontal plane perpendicular to the vertical plane in which the yarn arrives and is driven in a rotational movement at a constant speed. Usually, the yarn to be wound runs over the surface of a yarn guide which is located between the combining device and the support and moves in a [traverse] backward and forward motion parallel to the longitudinal axis of the rotating support.

Page 2, lines 14-29, please replace the paragraph with the following paragraph:

Application FR 2,703,671 teaches a method of winding yarn for the formation of a frustoconical bobbin using a drawn yarn that has come directly from a bushing and has not undergone a twisting operation. The yarn, which is taken through the yarn guide, is wound around a support fastened at its base to a flange and placed vertically, the yarn guide moving in a [traverse] backward and forward motion parallel to the longitudinal axis of the support.

To produce the frustoconical shape of the bobbin, the solution proposed is to use a drawing device, placed after the device for combining the filaments and a dancer roll placed between the drawing device and the yarn guide. The dancer roll can rotate freely about its spindle, which is fastened to the end of a spring-loaded arm, thereby making it possible to impose a predetermined tension in the yarn to be wound.

Page 5, line 25 to page 6, line 11, please replace the paragraph with the following paragraph:

According to the invention, the method of winding a yarn in superposed layers onto a cylindrical support of longitudinal axis x and fastened around a spindle driven in a rotational movement, in which the yarn is wound by running over a yarn guide which moves with a [traverse] backward and forward motion parallel to the x axis of the support and is controlled so as to form a bobbin whose shape has two frustoconical ends called the base cone and the unwind cone respectively, having respective generatrices which are inclined with respect to the x axis at two different respective acute angles, and a main body of frustoconical shape which joins the two frustoconical ends and the two end sections of which form the two bases of the respective two cones base and unwind cones with different diameters, D1 and D2 respectively, is characterized in that it comprises two rules governing the movement of the yarn guide, a first rule which is used to form part of the base cone, the last layer of yarn deposited according to this first rule going as far as the end of the unwind cone, and a second rule which is used to terminate the said base cone that has been started and, concomitantly, to form the main body and the unwind cone, the first layer of yarn deposited according to the second rule being parallel to the last layer deposited according to the first rule.

Page 6, lines 12-19, please replace the paragraph with the following paragraph:

According to one characteristic of the invention, the first rule governing the movement of the yarn guide consists in establishing [traverse] backward and forward motions parallel to the axis of the support between an initial position (x_0) and a final position (x_z) which correspond, in projection perpendicular to the support, to each of the end sections of the bobbin respectively, each [traverse] backward and forward motion being defined by:

Page 7, lines 13-24, please replace the paragraph with the following paragraph:

According to another characteristic, the second rule governing the movement of the yarn guide consists in executing [traverse] backward and forward motions parallel to the axis of the support, between an initial position which constitutes the final position (x_z) of the yarn guide according to the first rule and a terminal position (x_t) which lies between the final position (x_z) according to the first rule, and which is dictated by the value of the diameter D2 desired for the unwind cone to be formed, and the starting position for the last movement according to the first rule, each [traverse] backward and forward motion being defined by:

Page 12, lines 20-25, please replace the paragraph with the following paragraph:

The yarn guide 34 is driven with a horizontal [traverse] backward and forward motion M parallel to the longitudinal axis X of the support and, preferably, with a horizontal [traverse] backward and forward motion N perpendicular to the X axis, the latter motion being carried out concomitantly with the motion M as will be explained later.

Page 15, lines 27-34, please replace the paragraph with the following paragraph:

The winding method according to the invention is based on the [traverse] backward and forward motion imposed on the yarn guide 34. It is decomposed into two steps according to two respective rules governing the movement, the first creating part of the generatrix L2 of the base cone 12 and the second terminating the generatrix L2, and then

simultaneously forming the generatrices L1 and L3 of the body 11 and of the unwind cone 13 respectively.

Page 16, lines 4-8, please replace the paragraph with the following paragraph:

Between the positions x_0 and x_2, the yarn guide 34 performs several [traverse] backward and forward movements d_i, each of which comprises a forward travel a_i towards the position x_z and a return travel R_i towards the initial position x_0.

Page 17, lines 1-3, please replace the paragraph with the following paragraph:

Consequently, the yarn guide 34 performs, between the position x_0 and the position x_z, [traverse] backward and forward movements, each of which defines:

IN THE CLAIMS

Claim 14 (Cancelled).

Please amend the claims as follows:

--1. (Amended) A method [Method] of winding a yarn in a plurality of superposed layers onto a cylindrical support (20) [of] having a longitudinal axis (X) and fastened around a spindle (21) driven in a rotational movement, in which the yarn is wound by running over a yarn guide (34) which moves in a [traverse] backward and forward motion (M) parallel to the axis (X) of the support and is controlled so as to form a bobbin [whose shape has two frustoconical ends (12, 13) called the base cone and the unwind cone respectively, having respective generatrices (L2, L3) which are inclined with respect to the axis (X) at acute angles (α, β) respectively] having a shape with two frustoconical ends, said bobbin comprising a base cone (12) having a generatrix (L2) inclined at an acute angle (α) to the axis (X) and an unwind cone (13) having a generatrix (L3) inclined at an acute angle (β) to the axis (X), and a main body (11) which joins the two ends and has a frustoconical shape

[with a generatrix (L1) and the two end sections (11a, 11b) of which form the two bases (12a, 13a) of the respective two cones (12, 13) and have different diameters, D1 and D2 respectively, characterized in that it comprises two rules governing the movement of the yarn guide] said main body (11) comprising a generatrix (L1), an end section (11a) which forms a base (12c) of the cone (12), said base (12a) having a diameter D1 and an end section (11b) which forms a base (13a) of the cone (13), said base (13a) having a diameter D2, wherein D1 and D2 are different, said method of winding a yarn comprising, [a first rule which is used to form part of the base cone (12), the last layer of yarn deposited according to this]

governing the movement of the yarn guide with a first rule for forming a part of the base cone (12) wherein a last layer of yarn deposited according to said first rule going as far as the end (13b) of the unwind cone, and a second rule [which is used to terminate the said base cone (12) that has been started and, concomitantly, to form the main body (11) and the unwind cone (13), the first layer of yarn deposited according to the second rule being parallel to the last layer] for terminating the base cone (12) while forming the main body (11) and the unwind cone (13), wherein a first layer of yarn deposited according to the second rule is parallel to a last layer of yarn deposited according to the first rule.

2. (Amended) The [Winding] method according to Claim 1, [characterized in that] wherein the first rule governing the movement of the yarn guide [consists in] comprises establishing a plurality of backward and forward [traverse] motions parallel to [the] an x axis between an initial position (x_o) and a final position (x_z) [which correspond, in projection] said positions perpendicular to the support (20)[,] and to each of the end sections (12b, 13b) of the bobbin [respectively], wherein each [traverse] backward and forward motion [being defined by] comprises:

- a starting position (x_j), [of which that one for the first movement is the initial position (x_o) and that one for the following movements is a position to the rear of the starting position for the previous movement and always to the front of the final position (x_z), the position for the last movement being dictated by the value of the diameter D1 desired for the base of the base cone (12) to be formed] a first movement having an initial position (x_o), and a final position (x_z), wherein said starting position for a movement following the initial movement or a movement subsequent to the initial movement is to the rear of the starting position of a previous movement and in front of the final position (x_z), and a position for the last movement is defined by the diameter D1 of the base cone (12),

- an intermediate position (x_i) for reversal of the yarn guide, [which position always lies to the rear of the intermediate position for the previous movement and lies] wherein an intermediate position for a movement is always to the rear of an intermediate position for a previous movement and is to the front of the final position (x_z), and

- an ending position (x_{j+1}) which [constitutes the] is a starting position for the [following] subsequent movement wherein a last intermediate position is the final position (x_z) and the last movement [according to this first rule] does not cause [causing] a reversal [since the last intermediate position which then corresponds to the final position (x_z)].

3. (Amended) The [Winding] method according to Claim 2, [characterized in that] wherein the second rule governing the movement of the yarn guide [consists in] comprises executing [traverse] backward and forward motions parallel to the [X] axis X, between an initial position [which constitutes], said initial position the final position (x_z) of the yarn guide according to the first rule, and a terminal position (x_t) [which lies] between the final position (x_z) according to the first rule[, and which is dictated by the value of] defined by the diameter D2 [desired for the base] of the unwind cone (13) [to be formed], and the starting

position for the last movement according to the first rule, each [traverse] backward and forward motion [being defined by] comprising:

- a starting position (x_k), [of which that one for the first movement is the final position (x_z) according to the first rule and that one for the following movements is a position to the rear of the starting position for the previous movement] wherein a position of the first movement is the final position (x_z) according to the first rule, and a position for a subsequent movement is to the rear of the previous movement,

- an intermediate position (x_m) for reversal of the yarn guide, [of which that one for the first movement is the ending position that the yarn guide ought to have assumed if it had reversed the movement at the final position] wherein an intermediate position for the first movement is an ending position corresponding to a position of reversal of a movement at the final position (x_z) according to the first rule, and

- an ending position (x_{k+1}) [which constitutes the] wherein said ending position is a starting position for the following movement,

- the starting and ending positions for a movement always [being to the] in front of [those] a position for [the] a previous movement [so that each movement is shortened in terms of travel] to shorten a travel of each movement.

4. (Amended) The method [Method] according to Claim 2, [characterized in that the] wherein a plurality of successive starting positions (x_j) according to the first rule are separated by an equal distance (δ).

5. (Amended) The method [Method] according to Claim 2, [characterized in that the] wherein a plurality of successive intermediate reversal positions (x_i) according to the first rule are defined by the equation $x_i = x_o + i\Delta$, where Δ is a positive constant which depends on

[the] a slope to be given to the generatrix (L1) of the main body (11), and i varies from 0 to Z, where Z is a non-zero integer.

6. (Amended) The method [Method] according to Claim 3, [characterized in that the] wherein a plurality of successive starting positions (x_k) according to the second rule are separated by an equal distance (δ').

7. (Amended) The method [Method] according to Claim 3, [characterized in that the] wherein a plurality of successive intermediate reversal positions (x_m) according to the second rule are spaced apart by [the same] a distance (δ), said distance the same as [that] a distance separating the plurality of successive starting positions (x_j) according to the first rule.

8. (Amended) The method [Method] according to [any one of Claims 1 to 7] Claim 1, [characterized in that] wherein the yarn guide (34) is moved concomitantly with [the] a motion (M) parallel to the axis (X) in a coplanar motion (N) perpendicular to the axis (X) so that [the] a resulting motion is parallel to the generatrix (L1) of the main body (11).

9. (Amended) The method [Method] according to Claim 8, [characterized in that the] wherein a plurality of motions parallel (M) and perpendicular (N) to the axis (X) of the yarn guide (34) is [are] produced by an electronic drive device (36).

10. (Amended) The method [Method] according to Claim 8, [characterized in that] wherein the yarn guide (34) is moved by running along mechanical guiding means placed parallel to the generatrix (L1) of the main body (11) being formed.

11. (Amended) The method [Method] according to [any one of Claims 1 to 10] Claim 1, for which the yarn guide (34) consists of a cam, [characterized in that] wherein the speed of rotation of the cam can be varied.

12. (Amended) The method [Method] according to [any one of Claims 1 to 11] Claim 1, [characterized in that the] wherein a speed of rotation of the spindle (21) can be varied.

13. (Amended) The method [Method] according to [one of Claims 1 to 7] Claim 1, [characterized in that the] wherein a speed of movement of the yarn guide parallel to the axis (X) can be varied.

15. (Amended) A frustoconical [Frustoconical] bobbin obtained by the method according to [any one of Claims 1 to 13, characterized in that the] Claim 1, wherein an angle of inclination (α) of the [so-called] base cone (12) is between 40° and 75°.

16. (Amended) A frustoconical [Frustoconical] bobbin obtained by the method according to [any one of Claims 1 to 13, characterized in that] Claim 1, wherein the angle of inclination (β) of the unwind cone (13) is between 30° and 60°.

17. (Amended) The frustoconical [Frustoconical] bobbin according to Claim 15 [or 16, characterized in that], wherein the yarn has a waviness (52) [so that] to allow two coils [belonging] with two superposed layers to [respectively] intersect at a crossover angle (γ).

18. (Amended) The frustoconical [Frustoconical] bobbin according to Claim 17, [characterized in that] wherein the crossover angle (γ) is between 0.5° and 6°.

19. (Amended) The frustoconical [Frustoconical] bobbin according to [any one of Claims 15 to 18, characterized in that it] Claim 15, wherein said bobbin has a length, measured between the two end bases (12b, 13b) of the [respective] base and unwind cones[, which is] between 150 mm and 500 mm.--

Claim 20 (New).